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ABSTRACT

This paper describes Project PLAI (Promoting Learning through Active Interaction), a 4-year research-to-practice project designed to develop and validate an early communication curriculum for infants who are deafblind and their caregivers. The curriculum provides a step-by-step approach to assist caregivers in recognizing their infants' early and subtle communication behaviors and in responding to these contingently, thus providing opportunity and encouragement for reciprocal interaction. This sequence offers an innovative format to assist caregivers in developing the ability to analyze and respond to early, subtle, and difficult-to-interpret communicative behaviors of their infants. This report discusses the conceptual framework of the Project PLAI model and its unique strategies, including its emphasis on the skills of both the caregivers and the infants, support of the natural efforts of caregivers, and the infusion of interactive strategies within the context of family routines, thus supporting caregiver-interactions in culturally responsive ways. The modules and objectives of the PLAI curriculum are outlined and include: (1) understanding infant cues; (2) identifying high and low preference objects, persons, and events; (3) establishing predictable routines; (4) establishing turn-taking; and (5) encouraging communicative initiations. Findings from Project PLAI are discussed and indicate strong support for the effectiveness of the PLAI curriculum. (CR)

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Learning how to PLAI:
Ways to Promote Learning through Active Interaction with Infants who are Deafblind

by

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Project PLAI *Promoting Learning Through Active Interaction* is a four year research-to-practice project designed to develop and validate an early communication curriculum for infants who are deafblind and their caregivers. The curriculum provides a step-by-step approach to assist caregivers in recognizing their infants' early and subtle communication behaviors and in responding to these contingently, thus providing opportunity and encouragement for reciprocal interaction. This careful sequence offers an innovative format to assist caregivers in developing the ability to analyze and respond to early, subtle, and difficult-to-interpret communicative behaviors of their infants. Part of the strength of the Project PLAI model is in its demonstrated ability to develop turntaking and other early communicative behaviors in infants whose significant disabilities include both visual impairment and hearing loss as well as in its effectiveness in assisting caregivers to sustain and expand their repertoire of responsive interaction with such infants.

Conceptual Framework

The conceptual framework of the Project PLAI model is based upon the transactional theory (Sameroff & Chandler, 1975) which views developmental outcome as a consequence of the reciprocal interactions between the infant and the caregiving environment. From this perspective, the response behavior of the caregiver interacts with the communicative competencies of the infant to create a style of interaction that can range from mutually satisfying and developmentally beneficial to frustrating and developmentally inhibiting. Project PLAI provides a curriculum to support and enhance caregiver/infant interaction when the communicative competence of the infant has been adversely affected by significant developmental problems.

Considerable evidence suggests that the presence of a significant disability in

the infant may make it more difficult for caregivers to exhibit and maintain contingently responsive behaviors. Infants who have both vision and hearing losses are less responsive, less active and experience fewer mutually enjoyable interactions with parents than their nondisabled peers (Chen & Haney, 1996; Walker, 1982; Walker & Kershman, 1981).

Unique Strategies

Project PLAI represents an innovative early intervention approach which supports caregivers in responding contingently to unclear infant cues and signals; emphasizes the skills of both the caregiver and the infant; supports the natural efforts of caregivers (Chen, 1996); and infuses interactive strategies within the context of family routines, thus supporting caregiver-interactions in culturally responsive ways (McCollum & McBride, 1997). In the Project PLAI model, the early interventionist and the caregiver **identify** the infant's communicative behaviors. This involves close examination of videotaped activities as well as discussion with the caregiver to pinpoint the infant's cues and their meaning. At the same time, the caregiver's natural ways of responding contingently to the infant are identified and discussed.

The next step focuses on **developing** a repertoire of contingent responses. First, the infant's preferred modes for taking in and expressing communication are identified. Using this information, optimal methods and opportunities for reciprocal communication can be created. Examples of strategies for promoting reciprocal communication include providing appropriate additional cues; providing time for the infant to respond; manipulating the environment so that the infant is motivated to respond or initiate (e.g., interrupting or pausing during a favorite, familiar activity, withholding a desired object or action, providing a choice between two objects or

actions); and imitating infant vocalizations or actions. Through these strategies, contingency games (i.e., exchanges which are mutually satisfying and sustainable) are developed and individualized for each caregiver/infant pair (e.g., "peek-a-boo," "tickle tummy, " "gonna get you").

Finally, these games and interactive skills are **utilized** across a number of naturally occurring opportunities within the daily routine of the caregiver/infant pair. Mutually pleasurable routines within the natural environment are identified through discussion and structured observation to assist caregivers in recognizing natural play times (e.g., playing "peek-a-boo" while dressing the baby, or "tickle tummy" when changing diapers). Individualized contingency games are then matched to identified routines and implemented across these natural environments with assistance and feedback from the early interventionist.

The modules and objectives of the PLAI curriculum (Klein, Chen, & Haney, in preparation) are outlined below:

Module 1- Understanding Infant Cues

Goal: Caregivers will have a detailed picture of the ways in which the infant expresses the following: attention and interest; internal states such as pleasure and discomfort; and needs and desires.

Objective# I-A: Typical Daily Activities: Caregivers will complete Typical Daily Activities form describing infant's typical day.

Objective# I-B: State of Arousal: Caregivers will learn to identify the infant's state of arousal.

Objective# I-C: ABC Analysis: Through careful observation of antecedent events and consequences, caregivers will develop a clear understanding of the infant's typical

reactions in familiar routine events/activities.

Objective # I-D: Getting Caregiver's Attention: Caregivers will identify and describe ways in which the infant obtains the attention of the caregiver and for what purposes.

Objective # I-E: Internal States and Feelings: Caregivers will describe how the infant reacts to and expresses internal states/feelings.

Module II Identifying High and Low Preference Objects, Persons, and Events

Goal: Caregivers will develop a thorough understanding of what their infant enjoys and what the infant dislikes.

Objective #II-A: High and Low Preference: Caregivers will generate a detailed list of activities, persons, and objects which they believe their infant enjoys, and those the infant particularly dislikes.

Objective #II-B: Presentation and Removal: Caregivers will describe infant's reaction to the presentation and removal of specific objects, persons, and sensory events.

Module III Establishing Predicable Routines

Goal: Caregivers will create a daily routine which includes several predictable events which the infant is able to anticipate through recognition of certain cues (words, sights, or other sensations).

Objective # III-A: Creating a Predictable Daily Routine: Caregivers will create a predictable routine by identifying at least 5 daily events which can be scheduled in the same sequence each day.

Objective # III-B: Identifying Subroutines: Caregivers will identify predictable sequences within specific activities, i.e. "subroutines".

Objective # III-C: Adding Cues: Caregivers will identify specific auditory, visual, tactile, olfactory and kinesthetic cues which can be used to help their infant anticipate familiar

activities and daily events.

Module IV Establishing Turn-Taking

Goal: To develop a repertoire of familiar turntaking routines in which caregiver and infant can participate easily.

Objective # IV-A: Teaching the Request for More: Using information gained in previous Modules, caregivers will learn how to encourage infants to request "more" or a desired food or activity.

Objective # IV-B: Developing Turntaking Games: To Identify and extend any current turntaking routines through imitation.

Objective # IV-C: Generalizing Turntaking Games: Caregivers will generalize turntaking games across persons and settings.

Module V Encouraging Communicative Initiations

Goal: To increase the infant's rate of communicative initiations for the purposes of obtaining attention from significant others, obtaining a desired object or pleasurable event and expressing rejection.

Objective # V-A: Initiating Rejection: Caregivers will learn to increase baby's initiations by encouraging the baby to express rejection of a disliked object or activity.

Objective # IV-B: Increasing Initiations: Caregivers will learn to increase the infant's initiations by delaying an anticipated event.

Objective # IV-C: Getting Attention Intentionally: The caregiver will learn how to encourage the infant to obtain the caregiver's attention.

Preliminary Findings

Description of infants. The Project PLAI model has been field tested with infants and toddlers whose multiple disabilities include both vision and hearing losses and

their caregivers in two sites, southern California and Utah. Six families have been monolingual Spanish-speaking and 4 have been bilingual in the southern California group. In the past three years, a total of 32 infants (8 to 30 months at the first visit) and caregivers have begun the Project PLAI curriculum. These infants have significant medical needs and severe multiple disabilities. Sixteen infants had been hospitalized at least once, 13 have gastrostomies, 8 have seizures, 7 have tracheostomies, one has an oximeter, and one has a cardiorespiratory monitor. Consequently, 4 infants did not complete the curriculum because of medical needs and two because of family situations. To date the remaining 26 infants have taken between 6 and 16 months to complete the five modules on the curriculum. These infants represent a range of vision and hearing losses with the majority demonstrating some functional vision use and some response to sound. Ten infants have cortical visual impairment, 4 infants have colobomae, 2 infants have light perception, 12 infants have slight to mild hearing losses, 14 infants have moderate(7), severe (4) or profound (3) hearing loss and 11 of them had been prescribed hearing aids, 5 had been prescribed glasses for refractive errors, but few of these infants wear their glasses or hearing aids consistently, and 5 infants have a variety of eye conditions such as congenital ocular anomalies or optic nerve atrophy. These infants demonstrate moderate to profound developmental delays.

Background of early interventionists. Now completing its final year of model validation, Project PLAI has trained 19 early interventionists and support personnel of the original 32 infants to utilize the PLAI curriculum to support and facilitate caregiver/infant interactions. Of these, 1 is a paraprofessional, 5 have child development degrees or related degrees but minimal training in early intervention, 1

has a bachelor's degree in special education, 2 has certification in the deaf and hard of hearing area, 1 has certification training in the area of visual impairment, 1 has certification in the area of deafblindness, 1 has an educational background specific to working with older children who had severe or multiple disabilities, and 6 are completing a master's degree in early childhood special education. One is working on a credential specifically in deaf-blind early intervention. All were able to successfully implement the Project PLAI curriculum with their target families, although with varying levels of support from Project PLAI staff. In addition, a cohort of 12 early interventionists in a single southern California school district program have been trained to use the Project PLAI curriculum. These early interventionists have degrees in early childhood special education and/or credentials in the area of visual impairment or severe disabilities and serve a variety of infants with disabilities.

Data analysis. Videotapes of caregiver/infant interactions during bathtime and play are taken of each family at baseline and at the completion of Modules I, III, IV, and V. These videotapes are coded in several ways, including a global analysis of maternal, child, and dyadic characteristics and a microanalysis of the caregivers' use of cues and prompting procedures. As of February, 1998, the analysis of the available videotapes shows strong support for the effectiveness of the PLAI curriculum. For example, of the 15 caregivers who had completed Module III, which focuses on identifying and using cues to assist the infant in anticipating events, all reflected meaningful changes in their use of cues during bathtime. Most caregivers displayed an increase in their use of cues as well as an increase in the types of cues used. Of the 4 caregivers who did not increase their use of cues, 2 actually used fewer but more salient cues and 2 used more combinations of cues at critical times in the bath

procedure. The caregivers who have completed the modules display a trend toward increases in sensitivity and responsiveness towards their infants on the global rating scale. This trend is impressive in that the increases in sensitivity near statistical significance, even with the small number of caregivers who have completed all modules at this time. These caregivers also report feeling more "in tune" with their infants and more competent in terms of their ability to recognize their infants' subtle communicative behaviors. In addition, 7 of the 8 caregivers were noticeably using turntaking strategies during play time with their infants.

Family feedback. The project also facilitated annual focus group meetings in southern California and in Utah to obtain feedback from families and early interventionists regarding the implementation of the PLAI strategies. Although being videotaped was not a routine and comfortable process, the majority of families enjoyed viewing short segments of activities with the infant and found the observation and discussion with their early interventionist to be very helpful. A number of families recommended that this process should be used more frequently. One family did not want to view the tapes because of the severity of their child's medical needs and disabilities. Families reported that the initial interview regarding the child's communicative behaviors was helpful seeing their child as a communicator. They appreciated the close relationship between the questionnaire and the focus of the curriculum. Through the modules they learned what their child likes, how to have fun with their child, "how to be a caregiver and playmate rather than a therapist working on medical needs," when their child was available for play, and when he or she needed a break. The modules required them to observe their child and to interpret behaviors in a different way. The curriculum gave families the words to describe their

child's communication to others and ways to share strategies with other family members so that they could also communicate with the child. In addition to understanding the child's communication skills, families identified specific strategies that they found helpful, such as: cueing, turntaking, providing wait time, pausing in a favorite activity, and imitating the infant's vocalization. The use of cues was the most consistently used strategy. Family members reported that the use of touch and object cues prepared the child for activities that were startling or not preferred. "Once a cue worked, it helped us to do more." Other examples of family reports are captured in the following three vignettes.

Kerry gets attention

Kerry has such significant medical needs and severe multiple disabilities that her parents preferred not to view the videotapes that were taken for the project. During the initial interview, they reported that she could not intentionally seek their attention by any means. However, soon after they had completed Module I, they began to notice that her heart monitor tended to go off when they were not interacting with her. Was this a coincidence? Was it their imagination? Was the alarm triggered because Kerry was stressed? Did Kerry trigger the alarm intentionally? Kerry's mother and early interventionist conducted a little experiment. After playing with Kerry, they told her they were going to leave her alone for a while and moved out of Kerry's view. The alarm on the heart monitor went off. They repeated this sequence three more times and each time the alarm went off. Kerry is able to move the fingers of her left hand so the early interventionist obtained a switch that is activated with very slight pressure. Now Kerry, rings her switch-activated bell to get her parents' attention. This is an incredible accomplishment for Kerry and her parents.

Gary and his Grandpa

In Module II Gary's parents identified "Grandpa" as someone that Gary disliked. They felt quite uncomfortable with having to say this about a member of their family and discussed why Gary had such a negative reaction to his grandfather. They realized that Grandpa was very boisterous in his interactions with Gary and liked to make "raspberries." However, after they shared strategies with Grandpa that they learned in Module III and IV, he began to cue Gary to expect the "raspberry game." Gary now tolerates Grandpa much better that he did before.

Veronica and her mother, Velma

Veronica has a moderate hearing loss due to bilateral atresia, myopia in one eye and no vision in the other, severe developmental delays and hypotonia. In the baseline Comprehensive Communication Interview, Velma reported that she did not think that Veronica identified her as her mother. She felt that Veronica showed a preference for her father and reacted to his voice. At two years of age, Veronica communicated mainly through fussing and crying. Although they had been recommended, she had not yet been fitted with a bone conduction aid or glasses. By completing Module I with the early interventionist, Velma recognized how unpredictable the world was for Veronica. She received home visits from a infant development specialist, an occupational therapist, and an early interventionist who focused on visual stimulation.The family lived in an extended family household and Veronica received caregiving from her parents, grandparents, and aunts. Fred had a full time job and Velma worked part-time. Velma also began to observe Veronica carefully and to recognize when she was quiet and alert and ready for interaction.

Module II assisted Velma in realizing that Veronica enjoyed rough and tumble

play such as bouncing on a large ball and disliked her bathtime. By this time, Veronica had received her bone conduction aids and glasses but fussed when they were put on and removed them as soon as she could. Velma observed that Veronica rejected holding and shaking sound toys but would hold a wind up music box against her ear. These observations allowed Velma and the early interventionist to identify the characteristics of activities that Veronica preferred. By using the strategies in Module III, Velma began to create a predictable routine by identifying predictable events that could be scheduled in the same sequence. In addition, she developed touch and object cues that were used with Veronica during bath, dressing, meals, and playtime. Velma asked family members who cared for Veronica to use these cues consistently. So although the same person did not bath, dress, or feed Veronica at the same time every day, the same touch and object cues were used, and the activities occurred more or less in the same sequence. The consistent use of touch and object cues also helped Veronica to accept and wear her glasses and hearing aids.

In Module IV, Velma learned how to encourage Veronica to ask for "more" bouncing on the ball by using the interrupted routine strategy. She was pleased to observe that Veronica began to fuss and "growl" when she had forgotten to turn on the bone conduction aid - a naturally occurring delay in an anticipated activity. In addition, Velma found that Veronica discriminated her from other adults and liked to be close by. Veronica would roll and scoot on the floor to get close to her mother. As Velma and Veronica worked on the strategies in Module V, they participated in simple vocal sound-making and hand actions (patting) games. Veronica seemed to understand that she could initiate turntaking games because her mother would imitate her actions.

Velma says she now feels very attached to her daughter because she understands Veronica's behaviors, can interpret their meanings for everyone else, and is able to communicate so that Veronica can understand her. She tells other people that it is very important for all parents to work on early communication with their infants who have both vision and hearing loss and other disabilities. She sees how her intervention has supported Veronica's early learning, development, and exploration. Velma has become an advocate for Veronica's unique communication style, especially as Veronica has transitioned from infant programs to school-based preschool programs. Velma has informed Veronica's new teachers about the ways Veronica communicates, the cues she understands, and the need to remain consistent in the use of these (Haney, Chen & Alsop, 1997).

As of May 1998, 13 out of 14 caregiver/infant dyads in southern California have completed all 5 of the PLAI curriculum modules. Of the 13 dyads in Utah, 6 of the 8 families in the first cohort have completed all PLAI modules; 2 dyads have completed at least the first 3 modules and a second cohort of 5 infants have completed Module I. During the final months of the project, all data will be analyzed when the remaining caregiver/infant dyads have completed the curriculum. Final revisions will be made on the curriculum and an accompanying videotape will be completed. It is anticipated that these materials will be disseminated through a commercial publisher.

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